

The Animals of Silicon Valley

National Semiconductor's beastly ways have paid off, despite dubious efforts to diversify beyond chips.

by BRO UTTAL

In the cutthroat semiconductor industry, no company has a more fearsome reputation than National Semiconductor Corp. Known as the streetfighter of Silicon Valley, it has made a fetish of forcing down production costs for its broad line of microelectronic components, and it moves with lethal speed to slash prices, gobble up market share, and drive competitors from the field. "They're animals," marvels one of the company's largest stockholders.

National's beastly ways have paid off beautifully. Over the last three years, sales have doubled, far outpacing the rest of the industry. They hit \$980 million in the company's fiscal year that ended last May 31, making National third in size after Texas Instruments and Motorola. Though the company's after-tax profit margin of 5.3% was only middling for a chip-maker, its return on average equity was a strapping 26.6%.

Since then, a vicious price war has flared in the market for 16K RAMs—chips that can store 16,000 bits of data. Prices of these chips, which are the most popular components for computer memories, have fallen by more than half, but National is thriving in the free-for-all. Its stock recently hit an all-time high of \$51.50 a share before settling back to the low 40s.

Wall Street might hold National in even higher regard if the company's greed and combativeness—which have made it such a power in silicon—hadn't also driven it

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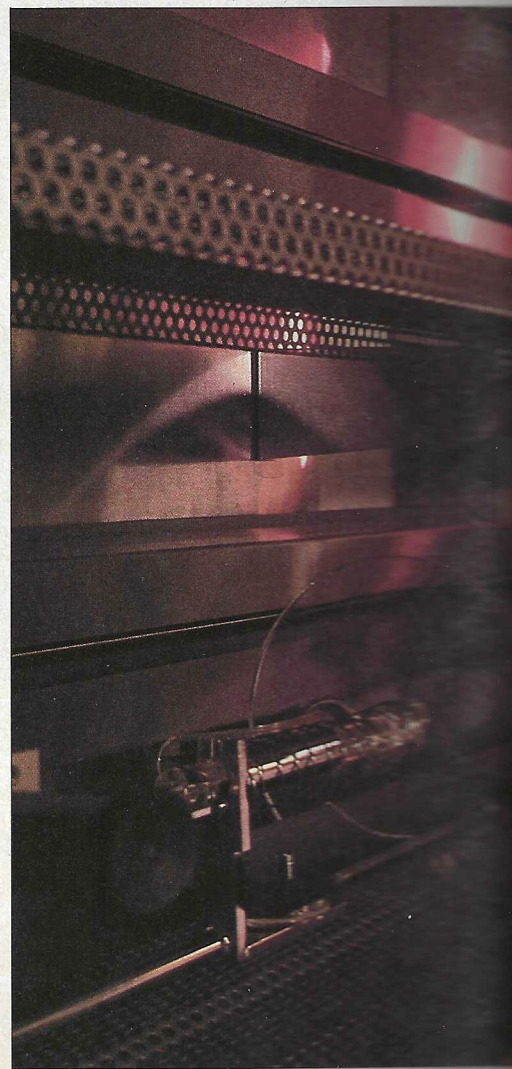
down thorny byways. Envious of the value its customers add to chips by putting them into products, the company keeps trying to "integrate forward" and make such products on its own. In 1976 and 1977, National dropped over \$10 million on electronic watches and calculators, and its stock skidded to \$11. Ten years ago the company developed automated check-out systems for supermarkets, but it didn't make satisfactory profits on them until very recently. Three times, National has announced plans to sell its own computers and has failed to ship any.

A zigzag strategy

Now the bully boys at National are taking their fourth and perhaps riskiest leap into computers. For the past year, National Advanced Systems, a new subsidiary, has been running a full-fledged computer business acquired from floundering Intel Corp. National's computer operations lost \$21 million in the company's last fiscal year, though they have since moved into the black.

Outsiders doubt the wisdom of National's latest move downstream, mainly because the company seems never to have had a coherent strategy for making products that use chips. One consultant at Strategic Business Services, a Silicon Valley market-research firm, notes, "Their product strategy is a zigzag, the result of somebody's having come up with a bright idea at the last minute."

The erratic push downstream has un-



questionably marred the company's performance. Since 1978, when National started breaking out results, its "digital systems" businesses have grown at only half the 49% yearly rate of components. They have, on average, knocked 2.1 percentage points off the company's operating profit margin and much more off its return on equity.

Perhaps for this reason, National shows signs of putting the emphasis back on components, where it is an undisputed winner. Already the lowest-cost producer

of many chips, it is driving for similar dominance in quality. Within a few months, the company expects to be making parts whose reject rates are as low as those of the best Japanese-made chips.

The C.E.O.'s Chevy pickup

Quick competitive responses are instinctive to National's tightly knit management team, whose four key members came from Fairchild in 1967. The chief is Charles E. Sporck, 53, a rangy, mustachioed electrical engineer who drives a

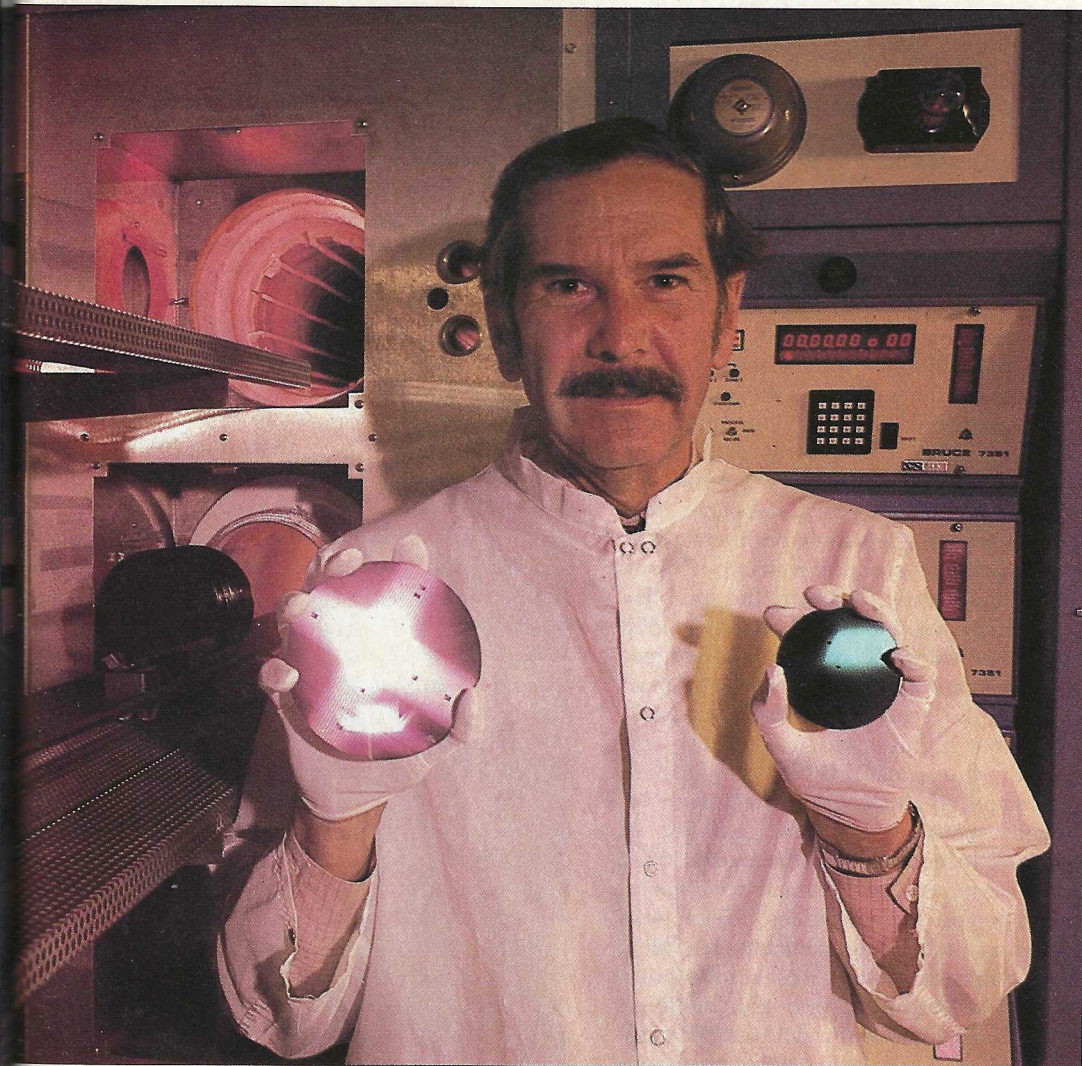
well-used 1978 Chevy pickup to work, runs in the company's mini-marathons, and holds a clutch of titles—president, chief executive officer, and chief operating officer—that allow him to call all the shots. Sporck made his mark at Fairchild partly by being one of the first managers to employ low-cost Asian labor for the tedious tasks of wiring and packaging electronic components after they are produced in the U.S. and elsewhere.

Sporck and three of his cronies were lured away from Fairchild by Peter J. Sprague, the chairman then as now, who hoped they could transform National into a semiconductor colossus. At the time, National was a money-losing \$7-million-a-year transistor company with a small business in integrated circuits. The new team turned around the transistor operations and set its sights on making linear circuits, used in products ranging from pocket radios to power-station controls. Starting as a second source—producing circuits designed by others—National later developed its own designs and came to dominate the linear field.

National used a similar approach with an important type of logic chip used in computers. Coming in after Sylvania and Texas Instruments, the company began as a second source, then joined in a vicious price war. Between 1969 and 1972 nearly two dozen makers essentially dropped out, including mighty Motorola, leaving National and TI to divide the bulk of the business. According to Dataquest, the industry's scorekeeper, these logic chips, together with linear circuits, account for two-thirds of National's component sales.

Along the way, National has developed a hard-nosed, frugal operating style. It keeps overhead down by using sales representatives and distributors instead of hiring salesmen; about one-third of Na-

Charlie Sporck, National's chief executive, compares a three-inch silicon wafer with one of the new five-inch wafers the company plans to use. The bigger one costs no more to process, but yields 2½ times more chips.



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tional's parts are sold through those channels. It has lowered production costs by moving labor-intensive operations across the Pacific. Today, nearly two-thirds of National's labor force of some 40,000 is concentrated in an arc of countries that stretches from Thailand through Indonesia to the Philippines.

The top managers have created a Spartan working environment. There are no private offices at National's headquarters in Santa Clara, California, just chest-high partitions. Wires hanging from the ceiling are common, potted palms and couches are not. This atmosphere extends throughout the company and has some unexpected benefits. Glen Madland, president of Integrated Circuit Engineering, a technical consulting firm, says, "National is the sweatshop of our industry—a pipe-rack, low-cost, survival-oriented company." But Madland adds, "Those who survive develop great *esprit de corps* based on hard work."

National's style often seems bizarre to the neophyte. John L. Nesheim, the 38-year-old treasurer, arrived a little over four years ago and couldn't believe his eyes or ears. "I was terrified," he recalls. "There was so much table-pounding and yelling at meetings that I thought the company was falling apart. People with degrees like a Harvard B.A. and a Stanford MBA last about 17 months—they can't cope." Nesheim insists there is a point to all the sound and fury: "It highlights problems quickly. Wide-open communications and rapid strategic planning are the nature of the beast at National."

"We thought we were supermen"

Strategic planning had nothing to do with National's entry into the watch and calculator markets in the early 1970s. "We saw a big opportunity because chips were being used so slowly in consumer products," says Sporck in his low, rumbling voice. "We thought we were supermen and everything would be marvelous." Dazzled by the chance to turn a \$3 chip and \$10 worth of other parts and labor into an item that it could sell

to stores for \$27, National introduced one of the industry's first hand-held, six-digit calculators in 1971. More elaborate models followed, along with digital watches.

National treated consumer goods just like chips: it offered a broad line and cut prices deeply to get high volume and drive competitors to the wall. The tactic worked well at first. During the slump of mid-1974 to mid-1975, when the earnings of other semiconductor companies plunged, the consumer businesses helped National to boost its profits slightly.

A disaster, however, began in the summer of 1976. Beset by increased competition from Japan and Southeast Asia, Sporck had bet whole new consumer-product lines on two innovative chips. Poorly controlled plant expansion, combined with a strike in Thailand and some technical snafus on the new chip lines, cut planned shipments of consumer products in half. The resulting loss became a gushing hemorrhage in 1977, a year, Sporck says, "that we don't talk about." Corporate earnings plunged from \$18 million to \$10 million.

Stanching the losses was the job of Fred Bialek, a member of the foursome that had come from Fairchild. A bald, Manhattan-born production expert who talks tough even by National's standards, Bialek shifted all consumer-products manufacturing to Asia and wiped out some 350 nonproduction jobs in the U.S. He pruned the product line, giving up \$20 million of sales, positioning the company's Novus-brand watch as a \$30 "poor man's Seiko" and concentrating on low-priced but highly styled calculators similar to the most successful Japanese products. In their struggle for volume, National's salesmen had been offering all sorts of incentives and discounts to all sorts of buyers, from small jewelers to huge, cut-price chain stores. "They were wheeling and dealing like a bunch of New York butchers," recalls Bialek, who put a stop to it. Within 15 months, he could point to a profitable if much smaller business. Since 1978, sales have increased very

little and National has lost market share, but the profit margins keep widening.

Bialek's tight fist has also kept National's business in checkout systems from going under. Again, spur-of-the-moment greed drew the company into the market. Members of a grocers' cooperative eager to increase supermarket efficiency cruised through Silicon Valley in 1971, offering to sell automated checkout systems for any company willing to make them. At the time, National was stuck with an orphaned product, a microprocessor—or "computer on a chip"—too sophisticated for most customers but a likely hit as the heart of an electronic cash register.

The cooperative welshed

For National, the business has been one long obstacle race. The microprocessor was too slow for the checkout system—called the Datachecker—and the product had to be redesigned three times. The cooperative that had enticed National into the business discovered it couldn't sell to its member stores. That forced National to build up a costly field staff.

By all accounts, Datachecker recently has become a quiet but solid success. Sales took off in National's 1980 fiscal year, when they leaped 60% to about \$80 million. Profits, which the company won't reveal, also have bloomed. In recent months, Bialek admits, sales have slowed down because soaring interest rates have damped construction of new stores. But he thinks the future is rosy. Even if no more supermarkets sign up, National could get another \$150 million of business by upgrading its installed systems.

Yet it isn't clear that the company should be in either the consumer or Datachecker businesses. Sporck admits that he sticks with consumer products only because "we paid our entrance fee and learned how to market—and we do make money." Datachecker makes more sense, but one close observer of the company says, "I'm not sure the business will ever be as big as Charlie hopes or that there's a place for streetfighters at the checkout counter. And I've never understood why

Fred Bialek, who has overseen National's halting entry into supermarket checkout systems, looks in on one of the company's Datachecker installations. The system uses a laser beam to read bar codes on packages.

they've wasted Bialek's talents there." Neither business does much to achieve its original goal of beefing up National's chip volume.

National's risky ventures into computer equipment are easier to understand. The company first entered the market in 1975 by offering computer memories that could be plugged into IBM systems. At the time, IBM was refusing to buy chips from outsiders, forcing them to sell memories of their own if they wanted to cash in on the demand for chips used in IBM-style memories, the largest single chunk of the semiconductor market. It was simple and lucrative for National to mount memory chips in boxes, add a power supply and some connectors, and sell these "add-on" memories to marketers of IBM-compatible equipment.

Floyd Kvamme, who heads computer operations, leans on the console of a Hitachi-made AS 9000 system that National has just begun to ship. Fewer than five of these \$4.5-million behemoths are running now in the U.S.



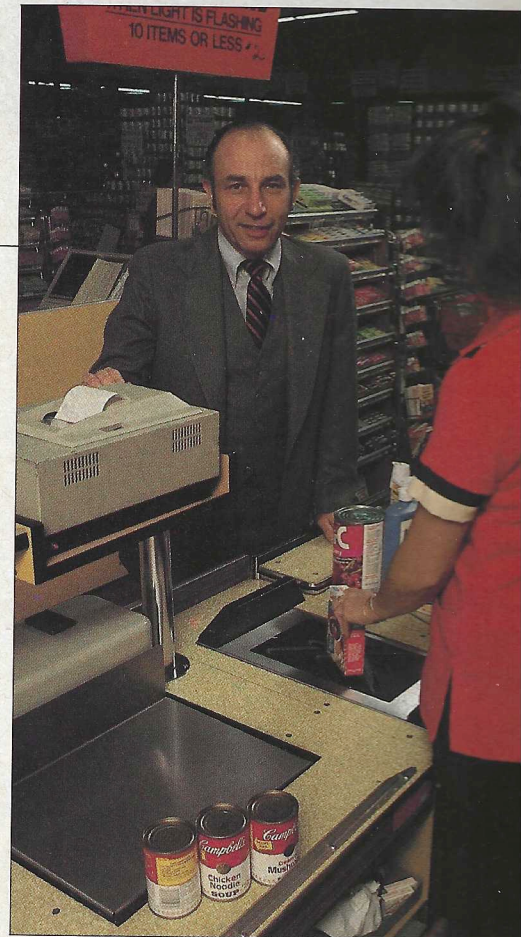
Computer users were eager to buy. IBM charged at least 20% more and shipped slowly, since it had underestimated demand for memory for its bigger machines. When Intel, National's main customer for memory, asked the company to supply large, IBM-compatible computers as well—and even led the chip-maker to an available design—National was happy to go into production.

National struck it rich. Just as it had with memory, IBM held a price umbrella over computers and later had trouble shipping enough of its more competitive models. Helping Intel fill the vacuum, National reaped an operating profit of some \$35 million on \$157 million of computer equipment sold in its 1978 and 1979 fiscal years. IBM-compatible gear accounted for only one-eighth of the company's total sales for those years, but no less than 29% of operating profits.

The trouble began when National, driven into a feeding frenzy by all the toothsome opportunities, decided to strike out on its own. In 1978 it announced the System 200, a computer compatible with Digital Equipment Corp.'s minicomputers; the System 400, a super-mini supposed to compete with IBM's smaller mainframes; and its decision to sell and service add-on memory directly instead of working only through other marketers. In a now-famous advertisement, Charlie Sporck, glowering and with a cigar in hand, appeared over copy that read, "National Semiconductor is crossing the Rubicon. We are entering the computer market with a range of sophisticated, system-level products."

A piece of good luck

Sporck and National soon seemed to be drowning in the Rubicon, not crossing it. They canceled the System 200 after getting tied up in a patent suit with Digital. Then they shelved the System 400 because of rising production costs, weak software, and competition from IBM. Unchastened, the company proclaimed in mid-1979 that it would offer another compatible processor, the NS 8500, which



would compete with one of the AS (Advanced System) computers it was supplying to Intel. This machine, too, was shortly abandoned, but for a different reason: it became redundant after Intel's breathtaking collapse gave National a chance to sell the AS line directly to customers and under its own name.

A flashy, San Francisco-based financial and marketing company, Intel had wildly overestimated the number of AS machines it could install and was being drained of cash by its bloated computer sales and service groups. (See "The Lease Is Up on Intel's Lavish Living," *FORTUNE*, October 8, 1979.) Sporck seems to have viewed the imminent demise of his biggest customer as a piece of good luck. National had wanted all along to build up its own worldwide field force for computers, but figured it would take three years of heavy investment. If National could take over Intel's operation at a good price, the chip company would become, presto chango, a real computer company.

Sporck used the supply contract to break Intel. As he puts it, with the men-

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acing blandness of Don Vito Corleone in *The Godfather*, "They thought we had a lot of leverage over them. We did." Earlier in 1979, Intel was still riding high but had asked National for a lower price in order to respond to IBM's announcement of much cheaper computers, which had thrown the market into a tailspin. National agreed, but forced Intel to sign up for even more processors in exchange. As the market continued to soften, Intel begged National to cut the price again and to reduce the number of machines Intel was obliged to buy. Hitachi Ltd., which made Intel's biggest compatible computers, had gone along with such pleas. National turned a deaf ear.

Intel's inventory and payables piled up inexorably. By September 1979, the company had some 100 computers gathering dust, owed National \$18 million, and was legally bound to buy at least another 60 machines for about \$20 million. Choking to death on the flood of AS computers, Intel abandoned its business to National on distress terms. In exchange for releasing Intel from the contract and deferring payment of the \$18 million, National got Intel's inventory back at prices close to manufacturing costs. Intel forked over its valuable base of customers and its field force to boot. It also pledged to advance up to \$7.5 million of working capital to National's computer subsidiary, and even offered under certain circumstances to buy \$30 million of preferred stock in the new company. One executive who was at Intel at the time says, "National blackmailed us and then stole the business."

Bargain prices helped

Contrary to industry expectations, National appears to have done well with its acquisition. Floyd Kvamme, National Advanced Systems' president and another of Sporck's pals from Fairchild, cut Intel's sales and service groups by 15%. He introduced ideas such as expense control, which were foreign to Intel. By the end of last May, he had worked through Intel's inventory, which National was obligated to sell on a one-for-one basis with its own

machines. Kvamme admits that bargain-basement prices had something to do with this feat. "The arrangement we had for taking machines out of Intel's inventory," he says with a straight face, "was not all that unattractive."

Though Sporck is one of the most anti-Japanese executives in Silicon Valley, National buys its biggest computers from Hitachi Ltd., Intel's old supplier. Late last year, National started shipping a huge new Hitachi product, the AS 9000, which competes with the long-awaited "H" series computer recently announced by IBM. National greeted IBM's announcement smugly. IBM won't ship in quantity until early 1982, and the somewhat slower AS 9000 should sell briskly to customers who need capacity today.

The future of National's computer business, now running at more than \$180 million a year, is still open to doubt. The company's ability to plan new products and systems has been shaky. A former engineering manager observes, "The disasters with the System 200 and the System 400 were the fault of bad planning, not bad luck. National's name is associated with failure in the systems business."

National's reputation for stinginess, moreover, does not reassure those who feel it takes a large investment in people, planning, and software to stay in the IBM-compatible computer arena. Finally, National's opportunism stamps its computer business with a big question mark. Even Treasurer Nesheim concedes that the company may keep getting in and out of the business as the probable return on investment goes up and down.

Lately, though, the whole idea of forward integration seems to have taken a backseat at National. There is a good reason for this shift in thinking. Because it has concentrated on making improved versions of other companies' chip designs, National has fallen behind in some of the hottest, most innovative components. It is now trying to catch up to its competitors and even leapfrog them.

In the most popular kind of computer memory chips—those 16K RAMs—Na-

tional was late in mastering the basic technology. Yet Sporck expects the company to emerge victorious from the current price-cutting "bloodbath," as he calls it. National is gambling millions on the most sophisticated design in the industry for a new type of memory chip, the 64K RAM, which has four times the capacity of the 16K chip. If it can master production of this design, it will have a head start on making the ultra-high-capacity 256K chips of the late 1980s.

A big cash sink

Long outdistanced by others in microprocessors, National is also launching its own family of computers on a chip. The company won't discuss the cost, but the project is sure to be the biggest cash sink around: Intel has already spent about \$100 million to develop a comparable product line. To fund microprocessor development, National drained well over \$8 million of profits from its non-chip businesses in fiscal 1978 and 1979, and much more than that since then.

In almost every segment of the semiconductor market, National is likely to make renewed efforts because the market is changing in ways that greatly favor it. Low-cost production and high quality are becoming more important, and these are National's strengths. Says Sporck: "We are catching up to the Japanese faster than any other U.S. company. And in making high-volume products, nobody can match our costs. No one."

National, then, is getting back to basics. Sales of all those "digital systems" have dropped from one-third of corporate revenues to one-fourth and should fall even lower. In fact, at last October's annual meeting, Sporck almost forgot to mention the non-chip activities. The reason, he says, is that "semiconductors are the most glamorous part of our business." Pierre Lamond, another Fairchild alumnus, who is National's technical director, is even blunter: "The best opportunities are in chips, not outside. Anybody who stresses forward integration isn't looking in his own backyard." F